# SEAMAP-SOUTH ATLANTIC COASTAL TRAWL SURVEY PROTOCOL

## INTRODUCTION

The Southeast Area Monitoring and Assessment Program - South Atlantic (SEAMAP-SA) Coastal Survey, funded by the National Marine Fisheries Service (NMFS) and conducted by the South Carolina Department of Natural Resources - Marine Resources Division (SCDNR-MRD), began in 1986. This survey provides long-term, fishery-independent data on seasonal abundance and biomass of all finfish, elasmobranchs, decapod and stomatopod crustaceans, sea turtles, horseshoe crabs, and cephalopods that are accessible by high-rise trawls in coastal nearshore waters. Additional data recorded for priority species include measurements of length or width for all priority species, sex and individual weights for blue crab, sharks, sea turtles, and horseshoe crabs, and reproductive information on commercially important penaeid shrimp and blue crabs.

## METHODS AND MATERIALS

**Data Collection** Sampling occurs annually within 24 spatial strata (yellow bars in Figure 1) within the coastal zone of the South Atlantic Bight (SAB) between Cape Hatteras, North Carolina, and Cape Canaveral, Florida (Figure 1). Strata are delineated by the 4 m depth contour inshore and the 10 m depth contour offshore. Within each sampling year, surveys are conducted in spring (April-May), summer (July-August), and fall (late September-October). At least 100 stations are sampled each season. Sampling effort is allocated equally among spatial strata, with a random selection of stations from a pool of stations within each stratum.

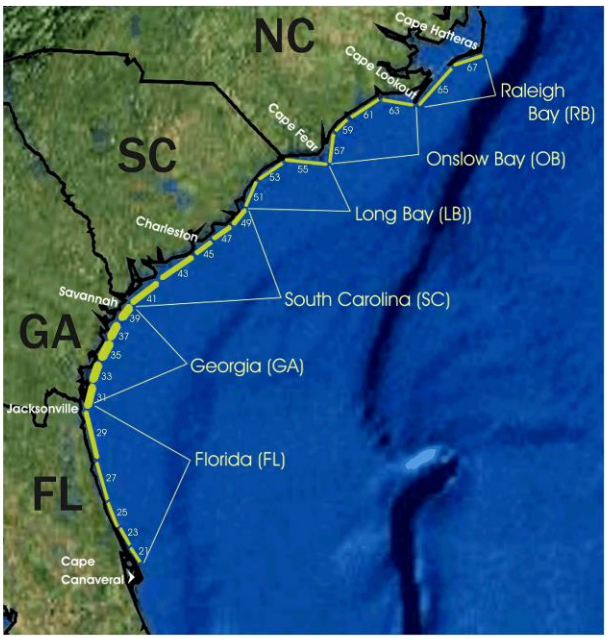


Figure 1. Strata sampled by the SEAMAP-SA Coastal Survey. (Strata are not drawn to scale)

The R/V *Lady Lisa*, a 75-ft (23-m) wooden-hulled, double-rigged, St. Augustine shrimp trawler owned and operated by the South Carolina Department of Natural Resources (SCDNR), is used to tow paired 75-ft (22.9-m) mongoose-type Falcon trawl nets (manufactured by Beaufort Marine Supply; Beaufort, S.C.) without turtle excluder devices. The body of the trawl is constructed of #15 twine with 1.875-in (47.6-mm) stretch mesh. The cod end of the net is constructed of #30 twine with 1.625-in (41.3-mm) stretch mesh and is protected by chafing gear of #84 twine with 4-in (10-cm) stretch "scallop" mesh. A 300 ft (91.4-m) three-lead bridle is attached to each of a pair of wooden chain doors which measure 10 ft x 40 in (3.0-m x 1.0- m), and to a tongue centered on the head-rope. The 86-ft (26.3-m) head-rope, excluding the tongue, has one large (60-cm) Norwegian "polyball" float attached top center of the net between the end of the

tongue and the tongue bridle cable and two 9-in (22.3-cm) PVC foam floats located one-quarter of the distance from each end of the net webbing. A 1-ft chain drop-back is used to attach the 89-ft foot-rope to the trawl door. A 0.25-in (0.6-cm) tickler chain, which is 3.0-ft (0.9-m) shorter than the combined length of the foot-rope and drop-back, is connected to the door alongside the foot-rope.

Trawls are towed for twenty minutes, excluding wire-out and haul-back time, exclusively during daylight hours (1 hour after sunrise to 1 hour before sunset) at 2.5 kt. Each net is processed separately and assigned a unique collection number. Contents of each net are sorted to species or genus, and total biomass and number of individuals are recorded for all species of finfish, elasmobranchs, decapod and stomatopod crustaceans, cephalopods, sea turtles, xiphosurans, and cannonball jellies. Only total biomass is recorded for all other miscellaneous invertebrates and algae, which are treated as two separate taxonomic groups. When large numbers of individuals of a species occur in a collection, the entire catch is sorted and all individuals of that species are weighed, but only a randomly selected subsample is processed and total number is calculated. For large trawl catches, the contents of each net are weighed prior to sorting and a randomly chosen subsample of the total catch is then sorted and processed. In every collection, each of the priority species is weighed collectively and individuals are measured to the nearest centimeter. For large collections of any of the priority species, a random subsample consisting of thirty to fifty individuals is weighed and measured. Additional data are collected on individual specimens of penaeid shrimp (total length in mm, sex, female ovarian development, male spermatophore development, occurrence of mated females), blue crabs (carapace width in mm, individual weight, sex, presence and developmental stage of eggs), sharks (total and fork lengths in cm, individual weight, sex), horseshoe crabs (prosoma width in mm, individual weight, sex), and sea turtles (curved and straight lengths and widths in cm, individual weight, PIT and flipper tag numbers). Marine turtles are released according to NMFS permitting guidelines.

Hydrographic data collected at each station includes surface-to-bottom temperature and salinity measurements (taken with a Seabird SBE-19plus CTD profiler), sampling depth, and an estimate of wave height. Atmospheric data on air temperature, barometric pressure, precipitation, and wind speed and direction are also noted at each station.